# Agilent Technologies 2G & 3G Solutions – Accelerating Progress

Agilent Technologies

**Agilent is dedicated to helping you achieve success with your wireless appliances, base stations, and services.**

Whether your particular challenge is to be first to design a new wireless phone, base station, or component, to ramp up a production line to full volume, or to ensure that there are no holes in your network, Agilent Technologies has products, services, and solutions to meet your needs.

Second generation (2G) systems were created to address the need for increased capacity over analog systems. Third generation (3G) systems for global communications are now being developed to make mobile data throughput a reality. Both technologies bring new challenges to the product development, manufacturing, deployment, and operation environments.

Agilent has demonstrated a commitment to the standards evolution and will continue to provide the best in design tools, test equipment, consulting services and worldwide support. Agilent will be there with you in the ongoing challenge of building the next generation of wireless communications.

This brochure outlines Agilent's comprehensive and connected solutions for 2G (GSM, GPRS, CDMA, and NADC) and 3G (EDGE, W-CDMA, cdma2000, and 1xEV-DO.) Use the table on pages 4 and 5 to find the Agilent products best suited to help you meet your test and measurement challenges. Agilent will continue to provide the best solutions, services, and support to accelerate your progress.

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# Technology Capabilities

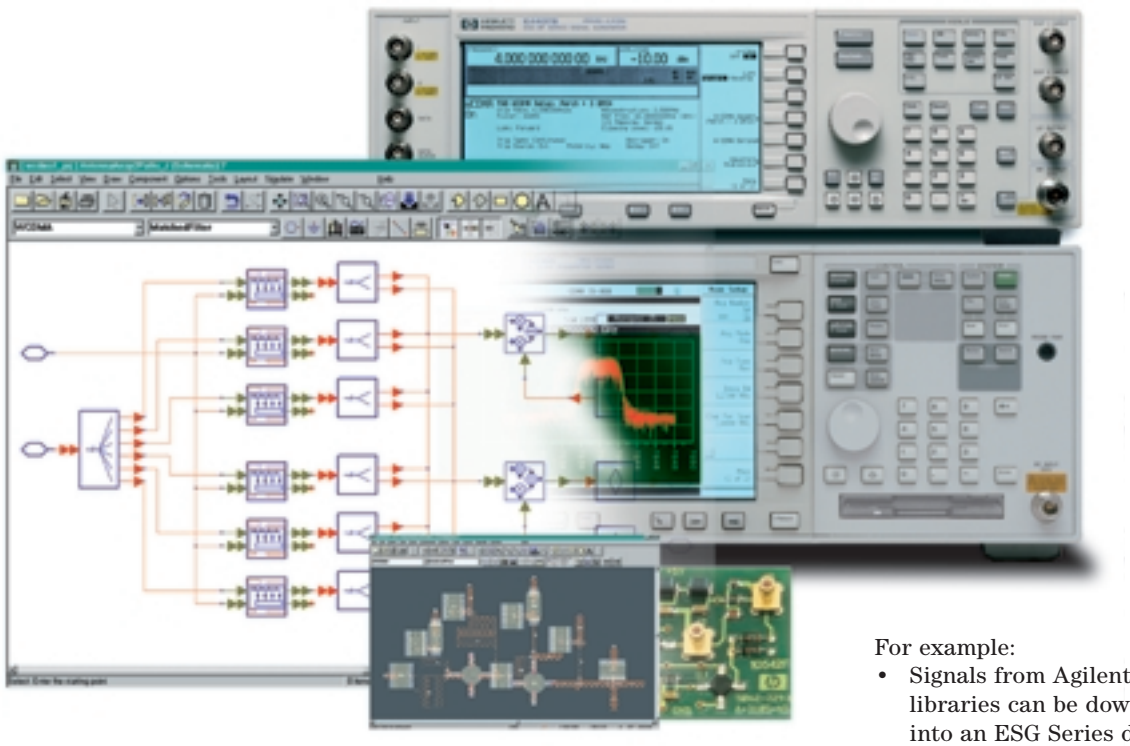
## Product

| | GSM | GPRS | NADC/TDMA | cdmaOne | EDGE | cdma2000 | 1xEV-DO | W-CDMA |
|---|---|---|---|---|---|---|---|---|
| **R&D** | | | | | | | | |
| ADS & Design Libraries | | | | | ● | ● | ● | ● |
| ESG Signal Generators | ● | ● | ● | ● | ● | ● | ● | ● |
| ENA Series Vector Network Analyzers | ● | ● | ● | ● | ● | ● | ● | ● |
| E4991A RF Impedance/Material Analyzer | ● | ● | ● | ● | ● | ● | ● | ● |
| 8960 Wireless Test Set with GPRS Lab Application | | ● | | | | | | |
| PSA Spectrum Analyzers | ● | | ● | ● | ● | ● | ● | ● |
| 89600 Vector Signal Analyzers | ● | ● | ● | ● | ● | ● | | ● |
| E4406A VSA Transmitter Testers | ● | | ● | ● | ● | ● | ● | ● |
| 8560 Spectrum Analyzer Series | ● | | ● | | | | | ● |
| ESA-E Portable Spectrum Analyzers | ● | ● | ● | ● | ● | ● | | ● |
| N4256A Amplifier Distortion Test Set | ● | ● | ● | ● | ● | ● | ● | ● |
| NFA Series Noise Figure Analyzers | ● | ● | ● | ● | ● | ● | ● | ● |
| EPM-P Series Meters and Sensors | ● | ● | ● | ● | ● | ● | ● | ● |
| E3600 dc Power Supplies | ● | ● | ● | ● | ● | ● | ● | ● |
| 6600 Series dc Power Supplies | ● | ● | ● | ● | ● | ● | ● | ● |
| 66319B/D & 66321B/D dc Sources | ● | ● | ● | ● | ● | ● | ● | ● |
| Device Characterization Software | ● | ● | ● | ● | ● | ● | ● | ● |
| Handset PA ValiFire | | | | | ● | | | |
| 54800 Series Oscilloscopes | ● | ● | ● | ● | ● | ● | ● | ● |
| 16700 Logic Analyzer Series* | | | | | | | | |

* The 16700 Series logic analyzers and associated products provide state, timing, and run control measurements for the digital portions in your 2G/3G designs.

# Technology Capabilities

| GSM | GPRS | NADC/TDMA | cdmaOne | EDGE | cdma2000 | 1xEV-DO | W-CDMA | Product |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | **Manufacturing** |
| ● | ● | ● | ● | ● | ● | ● | ● | AXI Sysyem |
| ● | ● | ● | ● | ● | ● | ● | ● | AOI System |
| ● | ● | ● | ● | ● | ● | ● | ● | ICT System |
| ● | ● | ● | ● | ● | ● | ● | ● | 93000 SOC Series Test System |
| ● | ● | ● | ● | ● | ● | ● | ● | 84000 RFIC Test System |
| ● | ● | ● | ● | ● | ● | ● | ● | ESG Signal Generators |
| ● | ● | ● | ● | | ● | | ● | 8960 Wireless Test Set |
| ● | ● | ● | ● | ● | ● | ● | ● | ENA Series Vector Network Analyzers |
| ● | ● | ● | ● | ● | ● | ● | ● | NFA Series Noise Figure Analyzers |
| ● | | ● | ● | ● | ● | ● | ● | E4406A Vector Signal Analyzer |
| ● | ● | ● | ● | ● | ● | | ● | ESA-E Series Spectrum Analyzers |
| ● | | ● | ● | ● | ● | ● | ● | PSA Series Spectrum Analyzers |
| ● | ● | ● | ● | ● | ● | ● | ● | 66000 Series Modular Power System |
| ● | ● | ● | ● | ● | ● | ● | ● | 66319 B/D and 66321 B/D dc Sources |
| ● | ● | ● | ● | ● | ● | ● | ● | 6600 Series and 6032A Series dc Power Supplies |
| ● | ● | ● | ● | ● | ● | ● | ● | EPM-P Power Meters and Sensors |
| ● | ● | ● | ● | | ● | | ● | N4051A/N4052A Wireless Test System |
| ● | ● | ● | ● | ● | ● | ● | ● | 4352S VCO/PLL Signal Test System |
| | | | | | | | | **Base Station Installation and Maintenance** |
| | | ● | ● | | ● | | | 8935 Series Base Station Test Solutions |
| ● | ● | | ● | | | | | ESA-E Series Portable Spectrum Analyzers |
| | | | ● | | ● | | | Base Station Over-Air Maintenance Tool |
| | | | | | | | | **Mobile Screening and Repair** |
| ● | ● | | ● | | ● | | | E6392B and E6393A/B Test Sets |
| | | | ● | | | | | 8924E CDMA Test Set |
| | | ● | | | | | | 8920B, 8922S and 89236B Test Sets |



### Agilent Advanced Design System and Design Libraries

- provides superior simulation technology and performance
- supported by the major foundries
- integrates with your design flow
- provides the most accurate and comprehensive set of wireless design libraries
- easy-to-use on PC or UNIX platforms
- provides expert help for ease of design with application-specific DesignGuides
- integrates with Agilent instrumentation to provide design and verification solutions

Advanced Design System (ADS) is a complete, integrated EDA software solution for communications product design. Designers of components, systems, and products in wireless and wireline communications would greatly benefit from accurate real-world conditions that can be simulated by ADS.

### Connected Solutions

You can develop your designs faster and more efficiently by bridging the gap between the design and prototype phases. By leveraging the breadth of Agilent's design tools and test equipment, you obtain a connected development solution that allows your software designs and hardware prototypes to interact in new ways.

For example:

- Signals from Agilent's design libraries can be downloaded into an ESG Series digital signal generator. This signal which may include simulated distortions may then be used to stimulate your hardware prototype.
- Captured data from a hardware prototype test can be analyzed with an 89600 Series vector signal analyzer. Then, the Advanced Design System can use the data to simulate a design under real-world signal conditions.

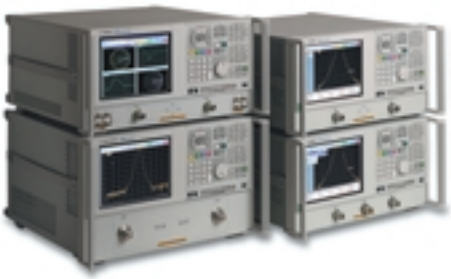
Connecting design tools and test equipment links the worlds of software design and hardware performance, making your product development processes more flexible, accurate and efficient.

For more information, please visit our Web site at: **www.agilent.com/find/eesof-eda**

# R & D

Signal Generators

Network Analyzers



## ESG Vector Signal Generators

- supports wireless communications standards including 3GPP W-CDMA, cdma2000, cdmaOne, EDGE, GSM, NADC, PDC, DECT, TETRA, *Bluetooth*™, 1xEV-DO, 802.11a, and 802.11b
- 250 kHz to 1, 2, 3, 4 and 6 GHz
- 160 MHz of RF bandwidth with external I/Q inputs
- 32 Msamples (160 megabytes) waveform playback memory
- differential I/Q outputs
- internal I/Q calibration
- superior absolute level accuracy

The ESG vector signal generator is ideally suited to meet today's receiver test and component test applications. For example, with W-CDMA and cdma2000, users can set $E_b/N_o$ and C/N ratios to perform sensitivity measurements more easily and accurately.

The internal dual-mode baseband generator with 80 MHz RF bandwidth, 100 MHz sample rate, and 32 Msamples memory is ideal for generating the higher data and symbol rates of 3G and broadband wireless communication systems.

For more information,
please visit our Web site at:
**www.agilent.com/find/esg**

## PNA Series Vector Network Analyzers

PNA Series' RF and microwave vector network analyzers provide the combination of speed and accuracy for the demanding needs of today's component test requirements. PNA Series' network analyzers are designed to expedite the overall testing process. The common distinctions include: high performance, a fully integrated Windows 2000® user interface, COM automation model, and embedded context-sensitive help, 16 independent measurement channels, built-in hard drive and supplied mouse. The instrument is well-suited for both R&D and manufacturing.

For more information,
please visit our Web site at:
**www.agilent.com/find/pna**

## ENA Series RF Vector Network Analyzers

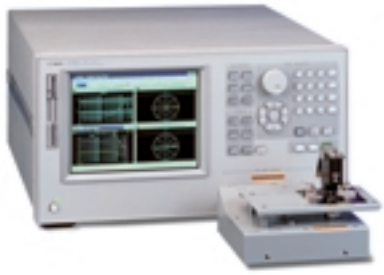
- built-in two to four test ports for efficient multi-port component measurements
- balanced conversion
- high accuracy
- full two to four port calibration
- network embedding and de-embedding
- expanded connectivity (GPIB, LAN, and USB)
- built-in VBA for measurement automation

The ENA Series offers built-in easy-to-use balanced measurements, which makes it the ideal instrument for accurate characterization of advanced handset components such as balanced SAW filters. Up to four test ports configurations, the 4-port ECal module, and enhanced display capabilities significantly facilitate the evaluations of multi-port components. The external test set is available for 9-port single connection measurements. Excellent basic measurement performance along with full two to four port calibration and network embedding/de-embedding ensure the measurement accuracy required for R&D.

For more information,
please visit our Web site:
**www.agilent.com/find/ENA**

# R & D

Impedance/Material Analyzer



## E4991A RF Impedance/Material Analyzer

- basic accuracy ±0.8%
- 3 GHz impedance direct read-out
- Windows®-styled user interface
- various sweep parameters (frequency, ac level, dc bias)
- built-in VBA programming function
- data transfer through the LAN interface
- direct read-out permittivity, permeability [option]

With the trend of wireless communications and digital equipment operating at higher frequencies, the need to evaluate RF components under higher and wider frequencies is increasingly important not only for circuit designers of equipment manufacturers but also R&D engineers of component manufacturers. The E4991A RF impedance/material analyzer offers 3 GHz measurement frequency range that covers hot applications such as W-CDMA, *Bluetooth*, and wireless LAN.

For more information,
please visit our Web site at:
**www.agilent.com/find/impedance**

Wireless Communications Test Set

## 8960 Series 10 Wireless Communications Test Set - E6701A GPRS Lab Application

- the parametric capability of our manufacturing solution
- accuracy and repeatability give confidence in mobile quality
- protocol logging
- more user-settable BS parameters
- data channels
- simplified programming for easy automation
- flexible architecture designed to grow with 3G technologies

The 8960 can now analyze parametric, signaling and timing integration, as well as provide transmitter and receiver testing and call processing capability used in manufacturing. For the R&D integration engineer, this translates into faster development time and fewer schedule delays. The built-in accuracy and repeatability of the 8960, necessary signaling functionality, ease-of-use, and affordability help increase R&D engineers' productivity and improve confidence in their device quality.

For more information,
please visit our Web site:
**www.agilent.com/find/8960support**

# R & D

Spectrum Analyzers

### PSA Series High Performance Spectrum Analyzers

- industry's most accurate spectrum analyzer
- industry's fastest low level spur search
- in-depth 2G/3G digital modulation measurement personalities
- phase noise measurement personality
- one-button power measurement suite (channel power, OB, ACP, multicarrier, CCDF, HD, burst power, TOI, SEM and spurious)
- three frequency ranges, 3Hz to 6.7 GHz, 13.2 GHz and 26.5 GHz
- complete set of detectors, including rms
- 2 dB step attenuator
- 160 resolution bandwith settings

Easily analyze all your RF, 2G and 3G signals in one instrument. The PSA series makes fast, accurate spectrum measurements and the most in-depth 2G/3G power and digital demodulation measurements easily – helping you evaluate the critical margins and tradeoffs in base station performance, efficiency and cost.

For more information,
please visit our Web site at:
**www.agilent.com/find/psa**

### 89600 Series Vector Signal Analyzers

- PC based software in Windows NT®, Windows 2000
- VXI based hardware
- built-in math functions
- 2.5/3G, wireless LAN, *Bluetooth* formats

The new 89600 Series VSA combines frequency domain, time domain, and modulation domain analysis to provide you with the set of measurement tools you need in today's fast moving digital communications market, especially wideband formats such as those found in LMDS, wireless LAN, *Bluetooth*, and other broadband systems. You can stream simulation data from ADS EDA software to the VSA software, letting you use the same tool to analyze both your design and your prototype hardware.

Agilent offers three systems, 89610A, DC to 40 MHz; 89640A, DC to 2.7 GHz; and the 89611A, 70 MHz IF VSA, each in a compact 4-slot mainframe. Use the 89611A with the PSA Series of spectrum analyzers or other down-converter to extend the frequency range of your vector signal analysis.

For more information,
please visit our Web site at:
**www.agilent.com/find/vsa**

### E4406A VSA Series Transmitter Tester

- one-button accurate W-CDMA, cdma2000, 1xEV-DO, cdmaOne, PDC, GSM/EDGE, NADC and PDC based measurements
- fast in-band modulation analysis
- exceptional accuracy and amplitude flatness
- simple, measurement-based user interface
- new baseband I/Q input option
- new 89601A software support for increased flexibility and enhanced demodulation capability

The E4406A VSA Series transmitter tester offers an excellent combination of speed and accuracy for making standards based measurements. The E4406A is designed to increase manufacturers' throughput while providing higher confidence in test results, the potential for increased profitability and the ability to provide tighter specifications to their customers.

For more information,
please visit our Web site at:
**www.agilent.com/find/vsa**

# R & D

Spectrum Analyzers

### 8560 EC Series Spectrum Analyzer

- high sensitivity, wide dynamic range
- phase noise: <–113 dBc/Hz at 10 kHz, 1 GHz
- displayed average noise level: –151 dBm
- 1 Hz resolution bandwidth (RBW)
- OBW/ACP measurement functions
- time-gated function

Agilent 8560 EC Series spectrum analyzers offer a solution for adjacent channel power (ACP) testing of bursted carrier signals using digital modulation, such as time-division multiple access (TDMA) and time division complex (TDD).

The 8560 EC Series allows measurements from 0.10 to 99.99% occupied bandwidth.

For more information,
please go to our Web site at:
**www.agilent.com/find/8560**.

### ESA-E Series Portable Spectrum Analyzers

- third order intercept: +12.5 dB
- ACPR 1st offset dynamic range: –67 dBc
- displayed average noise level: –166 dBm
- EVM modulation analysis
- 2G/3G multi-format RF power measurements
- wide range of detectors including RMS and average detectors
- flexible platform
- frequency coverage to 26.5 GHz
- seven measurement personalities
- 8590 Series code compatibility

The Agilent ESA-E Series spectrum analyzers with the modulation analysis measurement personality provides the flexibility of general purpose spectrum analysis combined with the numerical and visual tools that help to quickly identify and quantify impairments to digitally modulated signals for all major cellular standards.

For more information,
please go to our Web site at:
**www.agilent.com/find/esa**.

Distortion Test

### N4256A Amplifier Distortion Test Set

- extend measurement dynamic range for IMD and other amplifier distortion measurements
- 500 MHz to 4 GHz frequency range
- designed to extend dynamic range performance of Agilent PSA and ESA series spectrum analyzers
- reduces signal generator distortion products

The Agilent N4256A amplifier distortion test set improves dynamic range of spectrum analyzer based distortion measurements that are made on today's ultra-linear 3G power amplifiers. The N4256A utilizes a feed-forward cancellation technique to minimize signal generator distortion products and to improve spectrum analyzer dynamic range for IMD and ACPR measurements. Measurement dynamic range improvements as great as 25 dB are typical. The N4256A allows you to make distortion measurements where the distortion products are no longer buried in the spectrum analyzer's noise floor, which results in improved measurement uncertainty.

For more information,
please go to our Web site at:
**www.agilent.com/find/componenttest.**

# R & D

Noise Figure Analyzers

## NFA Series Noise Figure Analyzers

- a flexible and intuitive user interface
- easy measurement setup
- low instrument uncertainty
- color graphical display of noise figure and gain versus frequency
- enhanced PC and printer connectivity
- SNS Series noise source compatible
- ability to automatically upload ENR calibration data from SNS Series noise sources
- local oscillator control through second dedicated GP-1B
- one-year warranty as standard

The NFA Series is a family of high performance noise figure analyzers, designed to make fast, accurate, repeatable measurements more easily. Easy-to-use features make it easier for an engineer or technician to set up measurements correctly, view measurements in different formats, and print the results or save them to disk. On-screen limit lines simplify pass/fail testing.

For more information,
please visit our Web site at:
**www.agilent.com/find/nf**

Power Meters and Sensors

## EPM-P Series Power Meters and Sensors

- peak, peak-to-average ratio and average power measurements
- time-gated power measurements
- real-time cursor measurements and analysis display
- analyzer software for statistical and pulse analysis
- 5 MHz video bandwidth

The E4416A and E4417A high-performance, single and dual-channel power meters and E9320 peak and average power sensors provide a low-cost solution for peak, peak-to-average ratio, average power and time-gated measurements, for complex modulation formats.

The E9320 power sensors come with a choice of video bandwidth to suit your 2G/3G applications and maximize the usable dynamic range; therefore, one sensor can cover all your 2G/3G bandwith requirements.

For more information,
please visit our Web site at:
**www.agilent.com/find/powermeters**

Power Supplies

## E3600 dc Power Supplies

- low noise
- excellent line and load regulation
- up to 200 watts
- single, dual, and triple output models

Lab-bench work with sensitive 2G/3G circuitry requires reliable and stable dc biases. This series of dc power supplies includes models for basic lab bench setups, and also models with built in GPIB and RS232 interfaces for automated testing. Many different configurations are available, in order to provide the required number of outputs, and the appropriate voltage and current combinations.

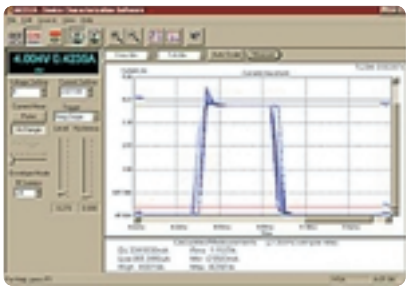
The new E3640A Series single and multiple output programmable dc power supplies are available in 30-100W models. Output voltage and current can easily be monitored via a computer and from the front panel meters. For general purpose use, these power supplies offer the performance of system power supplies at a surprisingly affordable price.

For more information,
please visit our Web site at:
**www.agilent.com/find/power**

# R & D

Power Supplies

Device Characterization



## 6600 Series dc Power Supplies

- low ripple and noise
- fast up and down programming speed
- full control over GPIB and front panel
- extensive protection features
- proven reliability

The 6600 Series has high-performance single output dc power supplies. Models are available at a variety of voltage/current combinations from 40 watts through 6,600 watts. The 5 kwatt and 6.6 kwatt models are very useful for testing MCPA assemblies and assembled base stations (6690 and 6680 families). The 500 watt and 2 kwatt models are well suited for power amplifier assemblies and subassemblies (6670 and 6650 families). The 40 watt, 100 watt, and 200 watt models are appropriate for subassembly and digital module testing (6640, 6630, and 6610 families).

For more information,
please visit our Web site at:
**www.agilent.com/find/power**

## 66319B/D and 66321B/D dc Sources

- 15V, 5A peak, 40W
- emulates the battery, simulates multiple battery types Li-Ion, Ni-MH, Ni-Cad
- excellent output stability with long load leads, requires no special cables
- transient free voltage response, fast output response technology
- accurate digitizing measurement system, three current ranges, measure uA to Amp pulsed currents
- flexible measurement system for measuring challenging battery current drains
- 14565A device characterization software provides an easy-to-use, no-programming battery drain test solution

Agilent's mobile communications dc sources are designed for the unique challenges of simulating batteries and power adapters/chargers in wireless handsets and other battery-powered devices that draw current in short, pulsed bursts.

For more information,
please visit our Web site at:
**www.agilent.com/find/pscare**

## Device Characterization Software

- for use with the Agilent 66300 Series mobile communications dc sources
- accurate measurement of both peak and microamp level current
- visualization of device current profiles
- view, save and copy profiles of current into associated Windows applications
- reference waveform save and recall
- accurate power source voltage response measurements

The Agilent 14565A device characterization software was designed for easy evaluation of battery powered device current profiles to ensure long operating life of devices. No additional current probes or scopes are required resulting in minimal wiring during set-up.

For more information,
please visit our Web site at:
**www/agilent.com/find/pscare**

# R & D

Systems

## E5700A Handset PA ValiFire

- EDGE and 3GPP handset power amplifier design verification
- pre-configured EDGE and 3GPP simulation and test in one environment
- correlation between simulation and measurement results
- test automation to sequence through multiple measurements or devices

Handset PA ValiFire system is a unique combination of hardware, software, and test expertise that comes pre-configured to perform EDGE and 3GPP simulations and tests thus, integrating the virtual design and physical prototype worlds. Only Agilent Technologies has the necessary design software and test and measurement expertise to develop this design validation system.

For more information,
please visit our Web site at:
**www.agilent.com/find/valifire**

Oscilloscopes

## 54800 Series Oscilloscopes

- simple tasks are simple again; advanced features are easy to access and control
- extensive connectivity makes it easy to document and share your work
- VoiceControl option enables hands-free operation
- new USB test option with embedded MatLab scripts
- new family of high bandwidth active probes and accessories simplify probing to 4 GHz.

Agilent Infiniium 54800 Series oscilloscopes combine the high performance of digital technology with the simple look and feel of analog oscilloscopes-including dedicated, color-coded knobs for each channel.

The new 54830B Infiniium family incorporates its advanced MegaZoom deep-memory technology, offering fast, usable, and affordable deep memory.

For more information,
please go to our Web site at:
**www.agilent.com/find/infiniium.**

Logic Analyzers

## 16700 Series Logic Analyzers

- available state, timing, oscilloscope, pattern generation, and run control modules correlate measurements to discover cause/effect relationships
- integrated debugging and analysis tools provide the views you need to gain insight – from signals to source code
- cross domain displays minimize the mysteries of hardware-software interaction
- eye scan feature allows you to quickly evaluate signal integrity across hundreds of channels simultaneously

The 16700 Series logic analysis system allows you to customize the measurement tools for your specific digital debug needs. The modularity allows you to protect your investment and keep up with rapidly changing technology trends. Networking and off-line analysis allow you to share data and results remotely.

For more information,
please visit our Web site at:
**www.agilent.com/find/logicanalyzer**

# Manufacturing

Electronics Manufacturing Test

SJ-50 automated optical inspection (AOI) system

5DX automated x-ray inspection (AXI) system

3070 powered in-circuit test (ICT) system

**Revolutionize the role of test**

- **manufacturing solutions**
- **board – level**
- **electrical/process test**

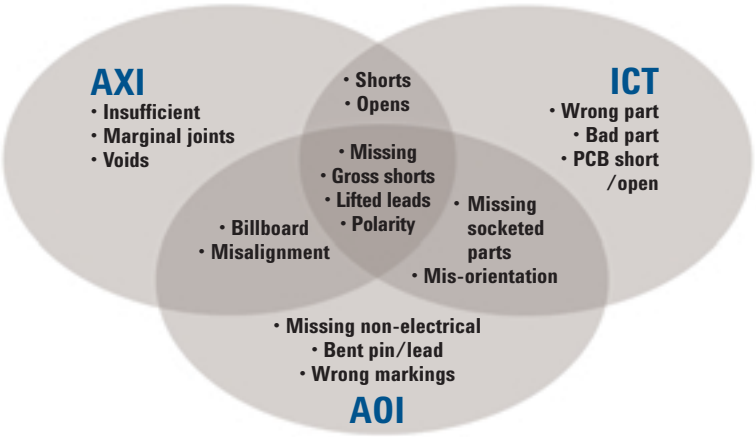
Increases in circuit density and circuit complexity are forcing manufacturers to look at a combination of available test and inspection methodologies to give the appropriate coverage in the most cost-efficient manner. Automatic inspection systems (x-ray and optical) give you the actionable information you need to be able to keep your process in control. Electrical process test (in-circuit) systems give you the confidence that the product works. These three different test and inspection methodologies have some overlap in terms of coverage but also tend to have key individual strengths, as seen in the figure below. Smart combinations of these techniques can increase test coverage while actually reducing the overall cost of test. Sharing information between systems is easy with Agilent's AwareTest software, a proven Intelligent Test solution that enhances process tracking and improvement by enabling data integration and transfer and real-time test monitoring.

For more information, please visit our Web site at: **www.ate.agilent.com/go/manufacturing**

## Coverage of **ICT:** in-circuit test **AXI:** automated x-ray inspection **AOI:** automated optical inspection

### Solder

- >95% solder coverage
- No access required
- Reduces field failures
- Prototype inspection
- No node-count limits
- 3D joint size/shape




### Electrical

- Most versatile solution
- High-volume global mfg.
- Limited-access test
- On-board programming
- Combo test

### Placement

• Replaces manual inspection • Pre-/post-reflow, end of Line • Can simplify ICT fixtures • 2D image processing of parts, joints

# Manufacturing

Semiconductor Test

### 84000 RFIC Series Test System

- models available with 2 to 12 RF ports, include multiple DC resources standard
- options for analog mixed signal stimuli and measurement
- rock solid correlation to laboratory grade RF bench tests

The 84000 RFIC Series is a complete, flexible and scalable system for high volume wafer and package testing of RF Integrated Circuit (RFIC) devices.

### 93000 SOC Series Test System

- complete testing for System-on-a-Chips (SOCs)
- supports cellular/PCS, *Bluetooth*, and WLAN SOC testing
- offers a robust set of capabilities:
  - ~ up to 1024 digital pin with data rates up to 2.5 Gbps
  - ~ wide range of analog modules,
  - ~ RF measurement suite provides up to 12 RF ports with 8 GHz modulated stimulus and measurement capability
  - ~ at-speed scan and embedded memory test capabilities

For more information,
please visit our Web site at:
**www.agilent.com/go/semiconductortest**

Signal Generators

### ESG Vector Signal Generators

- supports wireless communications standards including 3GPP W-CDMA, cdma2000, cdmaOne, EDGE, GSM, NADC, PDC, DECT, TETRA, *Bluetooth*, 1xEV-DO, 802.11a, and 802.11b
- expandable architecture with broad frequency coverage - (250 kHz to 1, 2, 3, 4 and 6 GHz)
- 160 MHz of RF bandwidth with external I/Q inputs
- 32 Msamples (160 megabytes) waveform playback memory
- differential I/Q outputs
- internal I/Q calibration

The ESG vector signal generator provides precise frequency and level control, and versatile modulation capabilities at an affordable price. They are ideally suited to meet the demanding requirements of today's receiver test, component test, and local oscillator applications. Using the high-speed processor, 32 Msamples waveform playback memory and 6 gigabytes waveform storage you can build waveforms fast and switch between them in playback and storage memory.

For more information,
please visit our Web site at:
**www.agilent.com/find/esg**

Wireless Test Sets

### 8960 Series 10 Wireless Communications Test Set

- test speed helps improve mobile test throughput
- accuracy and repeatability give confidence in mobile quality
- multi-format capability allows for flexible manufacturing
- reduced instruction set programming simplifies test code
- flexible architecture designed to grow with 3G technologies

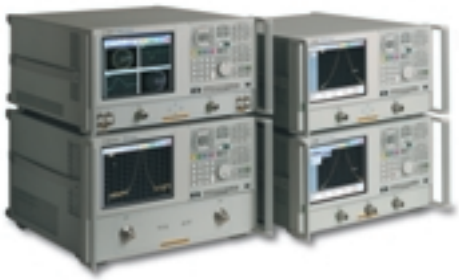
Developed for high-volume, automated mobile phone manufacturing test, the proven 8960 Series 10 test set helps manufacturers lower test costs and increase production output. The 8960 can be configured for GSM, GPRS, TIA/EIA-136, AMPS, cdma2000, IS-95 and W-CDMA IS-95. Multi-format test capability allows manufacturers to test multi-format devices with a single test set, change production from one format to another, or manufacture mobile devices with different formats on the same line.

For more information,
please visit our Web site at:
**www.agilent.com/find/8960support**

# Manufacturing

Network Analyzers

Noise Figure Analyzers



### ENA Series RF Vector Network Analyzers

- built-in two to four test ports
- fast multi-port measurement
- max 12.8 us/point
- full two to four port calibration
- balanced conversion
- high accuracy

The ENA Series offers built-in balanced measurements which makes it the ideal instrument for making accurate measurements on advanced handset components. The integrated measurement capabilities provide the lowest test cost per component and dramatically improve test throughput of multi-port and balanced components such as RF SAW filters.

For more information, please visit our Web site at: **www.agilent.com/find/ena**

### PNA Series RF and Microwave Vector Network Analyzers

The PNA Series' vector network analyzers provide the combination of speed and accuracy for the demanding needs of today's component test requirements. PNA Series' network analyzers are designed to expedite the overall testing process. The common distinctions include: high performance, a fully integrated Windows 2000 user interface, COM automation model, and embedded context-sensitive help, 16 independent measurement channels, built-in hard drive and supplied mouse. The instrument is well-suited for both R&D and manufacturing.

For more information, please visit our Web site at: **www.agilent.com/find/pna**

### NFA Series Noise Figure Analyzers

- a flexible and intuitive user interface
- easy measurement setup
- low instrument uncertainty
- color graphical display of noise figure and gain versus frequency
- enhanced PC and printer connectivity
- SNS Series noise source compatible
- ability to automatically upload ENR calibration data from SNS Series noise sources
- local oscillator control through second dedicated GP-1B
- one-year warranty as standard

The NFA Series is a family of high performance noise figure analyzers, designed to make fast, accurate, and repeatable measurements more easily. Easy-to-use features make it easier for an engineer or technician to set up measurements correctly, view measurements in different formats, and print the results or save them to disk. On-screen limit lines simplify pass/fail testing.

For more information, please visit our Web site at: **www.agilent.com/find/nf**

# Manufacturing

Spectrum Analyzers

### E4406A VSA Series Transmitter Tester

- one-button accurate W-CDMA, cdma2000, 1xEV-DO, cdmaOne, PDC, GSM/EDGE, NADC and PDC based measurements
- fast in-band modulation analysis
- exceptional accuracy and amplitude flatness
- simple, measurement-based user interface
- new baseband I/Q input option
- new 89601A software support for increased flexibility and enhanced demodulation capability

The E4406A VSA Series transmitter tester offers an excellent combination of speed and accuracy for making standards based measurements. The E4406A is designed to increase manufacturers' throughput while providing higher confidence in test results, the potential for increased profitability and the ability to provide tighter specifications to their customers.

For more information,
please visit our Web site at:
**www.agilent.com/find/vsa**

### ESA-E Series Portable RF/MW Spectrum Analyzers

- 4 ms sweep (401 points)
- 45 local measurements/second
- 45 remote measurements over GPIB/second
- VXIplug&play drivers
- 120 dB log display range (with digital RBWs)
- continuous background alignment
- 8590 Series code compatibility
- SCPI debug: diagnostic reporting of SCPI syntax errors

The Agilent ESA-E Series can help reduce manufacturing test time, time to market and costs. The spectrum analyzers provide 4-millisecond full-span RF sweep time, up to 45 measurements per second and up to 45 when transferred over GPIB (GPIB interface bus). To optimize the ESA-E Series for speed, variable sweep points (2 to 8192) and segmented sweep add to the flexibility of the platform.The analyzer's flexible platform allows manufacturing engineers to enhance performance as their requirements change.

For more information,
please go to our Web site at:
**www.agilent.com/find/esa**

### PSA Series High Performance Spectrum Analyzers

- industry's most accurate spectrum analyzer
- industry's fastest low level spur search
- in-depth 2G/3G digital modulation measurement personalities
- phase noise measurement personality
- one-button power measurement suite (channel power, OB, ACP, multi-carrier, CCDF, HD, burst power, TOI, SEM and spurious)
- three frequency ranges, 3Hz to 6.7 GHz, 13.2 GHz and 26.5 GHz
- complete set of detectors, including rms
- 2 dB step attenuator
- 160 resolution bandwith settings

Easily analyze all your RF, 2G and 3G signals in one instrument. The PSA series makes fast, accurate spectrum measurements and the most in-depth 2G/3G power and digital demodulation measurements easily – helping you evaluate the critical margins and tradeoffs in base station performance, efficiency and cost.

For more information,
please visit our Web site at:
**www.agilent.com/find/psa**

# Manufacturing

Power Supplies

### 66000 Series Modular Power System

- save rack space with up to eight 150 watt dc power supplies in one mainframe
- reduce test time using downloaded output sequences

The 66000 Series MPS is an excellent source for all of the low power bias needs in your test system. For base station final test and power amplifier test, it provides power for test fixtures and other system circuitry. For sub-assembly and digital module test, it also can provide the bias power for the assembly under test.

Controlled output sequencing makes it easy to bring up subassembly bias voltages in any order. The outputs can be enabled simultaneously, or you can define both the turn-on order and each turn-on delay.

There is a selection of six approximately 150 watt dc power supply modules. The maximum output ratings span from 8V at 16A to 200V at 0.75A. Optional output disconnect and polarity reversal relays add further to the flexibility and configurability of this power system.

For more information,
please visit our Web site at:
**www.agilent.com/find/power**

### 66319B/D and 66321B/D dc Sources

- 15V, 5A peak, 40W
- excellent output stability with long load leads, so no special or coax cable is required
- transient free voltage response
- fast output response
- measure wide range of current, from microamps to amps with accurate digitizing measurement system

Agilent's mobile communications dc sources are designed for the unique challenges of simulating batteries and power adapters/chargers in wireless handsets. The fast response helps to decrease test time, and increase production throughput. These dc sources also eliminate false handset shutdown during testing from invalid low-battery indication, which may be caused by power source transients.

For more information,
please visit our Web site at:
**www.agilent.com/find/pscare**

### 6600 Series and 6032A dc Power Supplies

- reliable, trouble-free dc power
- easy-to-use – reduce system development time with a standardized family of power supplies

Agilent offers an extensive selection of dc power supplies to meet the power requirements of all sizes of base stations during final test. All have the exceptional reliability that Agilent power products are known for, which is key for keeping your production facility running smoothly. Protection features within each power supply provide for smooth limiting and/or shutdown of the dc power if a problem in the module under test occurs.

The 6600 series are high-performance dc power supplies. Models are available at a variety of voltage/current combinations from 40 watts through 6,600 watts.

The 6032A is perfect for testing both 24 volt and 48 volt base station power amplifiers in one system with one power supply.

For more information,
please visit our Web site at:
**www.agilent.com/find/power**

# Manufacturing

Power Meters and Sensors

### EPM-P Series Power Meters and Sensors

- peak, peak-to-average ratio and average power measurements
- time-gated power measurements
- fast measurement speed over the GPIB
- 5 MHz video bandwidth
- stored sensor calibration factors, linearity and temperature correction for best accuracy and ease-of-use

The E4416A and E4417A high-performance, single and dual-channel power meters and E9320 peak and average power sensors provide a low-cost solution for peak, peak-to-average ratio, average power and time-gated measurements, for complex modulation formats.

Fast measurement speed, over the GPIB, up to 1,000 corrected readings per second, helps to reduce test times and improve manufacturing productivity and efficiency.

The E9320 power sensors come with a choice of video bandwidth to suit your 2G/3G applications and maximize the usable dynamic range; therefore, one sensor can cover all your 2G/3G requirements.

For more information,
please visit our Web site at:
**www.agilent.com/find/powermeters**

Systems

### N4051A/N4052A Wireless Test System

- reduce test development time
- reduce time to market
- reduce time to ramp-up volume
- reduce overall test cost per device
- saves space with multiple-up architecture

The N4051A/N4052A is a pre-built functional test system based on the Agilent 8960 Series 10 wireless test set. With the new E8421A wireless test fixture, and the E6560A cdma2000/IS-95 wireless test manager, you get the benefits of extremely fast measurements, outstanding performance and accuracy, ease of programming, and a flexible platform designed to accept new technologies without having to do a major redesign of your system.

For more information,
please visit our Web site at:
**www.agilent.com/find/wtsystem**

### 4352S VCO/PLL Signal Test System

- frequency range: 10 MHz to 3 GHz (with the 8664A or PSG Series microwave signal generator), up to 12.6 GHz (with the 43521A down converter, and the 8665B or PSG Series microwave signal generator)
- automatic measurement with build-in IBASIC programming
- graphical analysis of basic VCO/PLL characteristics
- fast and excellent phase noise measurements
- ultra-low-noise internal dc power supply
- frequency transient measurement
- high-speed test throughput

The 4352S is a complete system that offers a frequency range from 10 MHz to 12.6 GHz and is capable of measuring phase noise, RF power, frequency settling time, and more parameters required for VCO/PLL evaluation.

For more information,
please visit our Web site at:
**www.agilent.com/find/4352S**

# Base Station Installation and Maintenance

### 8935 Series Base Station Test Solutions

- comprehensive analog/digital TX/RX RF test solution
- a rugged, one-box test set
- illustrates noise levels, data and voice traffic to identify capacity issues
- Time Offset Precision Calibration Measurement for gpsOne position location networks (and similar systems)
- accurate power and modulation measurements
- large, bright, electro-luminescent display for easy operation
- base station specific automation software for fast, consistent, measurements
- cdma2000 1XRTT test capability for the E6380A

The 8935 Series of base station test solutions are full featured, one-box test sets designed to meet the needs of network equipment manufacturers, installation teams and service providers. The 8935 Series consists of the E6380A AMPS/CDMA/ cdma2000 test set and the E6381A AMPS/TDMA test set.

For more information,
please visit our Web site at:
**www.agilent.com/find/basestations**

### ESA-E Series Portable Spectrum Analyzers

- five-minute warm up
- built-in help
- background auto-alignment
- snap-on battery/12V operation
- rugged packaging and construction
- flexible platform
- frequency coverage to 26.5 GHz
- external mixing capability to 325 GHz
- seven measurement personalities
- full 3G demodulation with 89601A link utility

Agilent's ESA-E Series spectrum analyzers are protected by a very rugged case for lasting accuracy in tough environments. Rubber-encased frames and lack of vibration-prone internal adjustments improve reliability during transportation. A communications focused user interface, large, high-resolution color display, and built-in help make the ESA-E Series easy to use in a wide variety of conditions.

For more information,
please visit our Web site at:
**www.agilent.com/find/esa**

### Base Station Over-Air Maintenance Tool

- over-air base station testing
- performs code domain power and other RF measurements
- illustrates data and voice traffic to identify capacity issues
- automated report generator
- data recording and playback
- provides a feasible method to maintain hard to reach sites - including pole tops
- supports cdma2000 and major CDMA networks

With Agilent's Over-Air Maintenance Tool, maintaining hard to reach CDMA base stations is now practical and convenient. Technicians can execute first-level diagnostics from the comfort of their own vehicle. Measurements are fast (less than five minutes per sector) and easy (two or three mouse clicks from start to finish with a complete report).

For more information,
please visit our Web site at:
**www.agilent.com/find/basestations**

# Mobile Screening and Repair

Test Sets

### E6392B and E6393A/B Mobile Station Test Sets

- low price with the best price performance ratio in it's class
- easy-to-use – learn in 30 minutes
- provides consistent and reliable test results
- built-in DC source for power supply and power consumption testing
- Point of Service Test (PoST) Server software networks multiple distributed test sets running PoST software via the Internet or intranets
- PoST software automates testing and provides data base management

Agilent's E6392B GSM (GPRS) and E6393A/B CDMA/AMPS mobile station test sets are low cost, high performance solutions that go beyond the functionality of typical go/no-go testers. Our test sets check the overall functionality of a mobile phone and provide the essential transmitter/receiver measurement capabilities that you need to diagnose and repair module-level faults.

For more information,
please visit our Web site at:
**www.agilent.com/find/mobiles**

### 8924E CDMA Mobile Station Service Test Set

- low cost and user-friendly interface for service market
- AMPS and IS-95/95A/B and J-STD-008 CDMA digital phone test capability
- both functional and parametric phone testing
- CDMA base station simulator
- optional PCS frequency coverage
- supports 14.4 Kb vocoder test
- supports SMS and authentication

The 8924E CDMA mobile station service test set provides the essential set of measurements required to verify the performance of CDMA and analog mobile phones in service applications. It is best utilized when used in conjunction with the E8290A Point of Service Test (PoST) PC-based software. This allows you to make fast, accurate, and repeatable measurements with minimal training.

For more information, please visit our Web site at:
**www.agilent.com/find/mobiles**

### 8920B, 8922S, and 89236B Manufacturing Test Sets

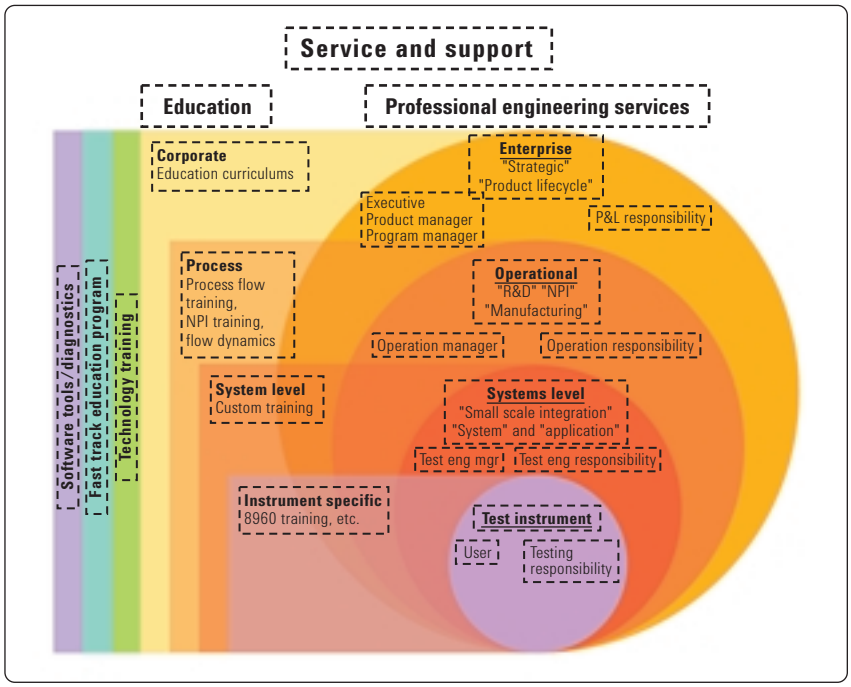
- integrated one box test sets for cellular/PCS mobile service
- full-function including RF parametric and call processing testing
- automated software available for ease-of-use

Agilent's integrated one-box mobile test sets are used in mobile service applications for incoming inspection or mobile repair. These one-box test sets provide accurate and fast RF parametric measurements on the transmitters and receivers of the mobiles. These test sets emulate a base station and provide call processing testing capabilities. Automated software is available to speed up the testing process and to simplify the user interface.

For more information,
please visit our Web site at:
**www.agilent.com/find/mobiles**

# Service and Support

## Support Overview




In a constantly changing environment, Agilent's ability to understand your business needs and quickly provide the latest end-to-end service and support solutions can give you the certainty and confidence to accelerate the development and deployment of winning technologies for your customers.

### Knowledge Services

As the world leader in test equipment, we have first-hand knowledge that you can apply toward streamlining test equipment technologies. No matter what type of Agilent equipment you have, our knowledge services can help maximize profitability and operational efficiency in your design, test, or manufacturing applications.

### Professional Engineering Services

- enterprise engineering service
- manufacturing operational assessment
- test diagnostic services
- R&D process assessment
- new product introduction (NPI) transition service
- small scale integration service
- system engineering service
- application engineering service
- test instrumentation engineering service

Our overall methodology is to develop a clear, thorough understanding of your business goals, critical success factors, obstacles, and their implications.

This serves as the foundation for developing appropriate recommendations for test strategy, methods, processes and tools. We will work with your team to define ways to improve the deployment, capability, effectiveness and throughput of your test processes, as well as the use of information geared for testing, which can contribute to improved business performance.

### Education and Training

Agilent's education and training program offers you access to our depth of product expertise and helps keep you abreast of emerging technology. Encompassing technology education classes, product training, measurement fundamentals and applications training, our classes can be delivered on-site or at an Agilent Training Center.

For a complete list of course offerings in your area, please visit us online at: **www.agilent.com/find/education.**

Examples of wireless courses:

- 3G technology overview
- GSM: programming the Agilent 8960 for mobile station test
- RF and microwave fundamentals
- 89600 vector signal analyzer course
- cdma2000 technology
- *Bluetooth* for wireless technology fundamentals

# Service and Support

Support Solutions

Agilent's innovative support solutions help you meet your business goals. No matter what kind of Agilent equipment, or how much, Agilent's support solutions can help you get more from your test equipment. You can tailor our support solutions by choosing the level of support you need to balance cost and response times. Build the package you need today and change or add to it at anytime.

### Repair Services

Agilent is the safe choice for your instruments providing expert high-quality, fast repair.

- 3 or 5-year support options available at the time of product purchase
- 12-month service contract, post-warranty option
- per incident repair program with fixed-price repairs

### System Uptime Services

System downtime can be expensive. Agilent's global resources and expertise prevent many system failures and provide solutions to your problems fast. Our system uptime services include a variety of on-site services such as installation, integration and verification, preventative maintenance, calibration, and repair for selected systems and individual instruments. You can choose the response time that most suits your needs. For critical applications, we can often have an engineer at your site within a few hours

### Cooperative Support

Agilent 's Cooperative Support service puts you in control and gives you the support you need when you need it. We provide backup support for replacement parts, diagnostic tools, system training, and remote troubleshooting.

### Calibration Services

Agilent's quality calibration service guarantees measurement confidence so you can keep your instruments operating at peak precision. All calibration measurements are traceable to international standards for reliable, accurate results. You can choose return-to-Agilent or on-site service and order the service as needed or on a regularly scheduled basis.

### Volume On-Site Calibration (VOSCAL)

Agilent's VOSCAL service minimizes instrument downtime and associated costs by delivering to your site a fully operational, high-quality calibration laboratory complete with high-specification automated systems and specialized calibration techniques. You receive a quality calibration without interfering with your output schedule.

### Equipment Management Services

To help manage all your test and measurement assets, Agilent's global equipment management solution enables you to maximize utilization and reduce ownership costs of your test equipment. We can help you track the equipment you have, where it is being used, and when it needs to be serviced. The calibration and repair history is documented at both the system and instrument level.

For more information,
please visit our Web site at:
**www.agilent.com/find/tm_services**

## For more information

### Online:

**www.agilent.com/find/3G**
for additional information, products, links and literature on 3G

**www.agilent.com/find/2G**
for additional information, products, links and literature on 2G

**www.agilent.com/find/wireless**
for complete information about Agilent's solutions for the wireless industry

**www.tm.agilent.com**
for information about Agilent's broad selection of test and measurement equipment

To receive regularly scheduled e-mail updates about new products and new information, register at:
**www.agilent.com/find/emailupdates**

### Literature:

*Wireless Communications Products, Services and Solutions*
catalog, literature number 5968-6174E

*Agilent Solutions and Services for Wireless Equipment Manufacturers*
brochure, literature number 5980-3118EN

*Agilent Solutions for Designing and Manufacturing Wireless Appliances*
brochure, literature number 5988-1504EN

*Agilent Solutions for Designing and Manufacturing Base Transceiver Stations and their Components*
brochure, literature number 5988-3706EN

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**Agilent Technologies Test and Measurement Support, Services, and Assistance**
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

**Our Promise**
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

**Your Advantage**
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

By internet, phone, or fax, get assistance with all your test and measurement needs

### Online assistance:
### www.agilent.com/find/assist

Phone or Fax
**United States:** (tel) 1-800-452-4844

**Canada:** (tel) 1-877-894-4414
(fax) (905)-282-6495

**China:** (tel) 800-810-0189
(fax) 1-0800-650-0121

**Europe:** (tel) (31 20)-547-2323
(fax) (31 20)-547-2390

**Japan:** (tel) (81)-426-56-7832
(fax) (81)-426-56-7840

**Korea:** (tel) (82-2)-2004-5004
(fax) (82-2)-2004-5115

**Latin America:** (tel) (305)-269-7500
(fax) (305)-269-7599

**Taiwan:** (tel) 080-004-7866
(fax) (886-2)-2545-6723

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